SPECIFICATION AMENDMENTS

On page 1, insert above line 1, insert--Priority Claim

The present application claims priority on European Patent Application 02257619.3 filed November 4, 2002.--

Delete line 6 – 10 of page 1.

Paragraph at line 17 of page 2 has been amended as follows:

-- An example of a study directed to effects of different shapes on catalytic performance can be found in the article by I. Naka and A. de Bruijn (J. Japan Petrol. Inst., Vol. 23, No. 4, 1980, pages 268-273), entitled "Hydrodesulphurisation Activity of Catalysts with Non-Cylindrical Shape". In this article experiments have been described in which non-cylindrical extrudates with cross-sections of symmetrical quadrulobes, asymmetrical quadrulobes and trilobes as well as cylindrical extrudates with nominal diameters of 1/32, 1/16 and 1/12 inch were tested in a small bench scale unit on their ~~hydrodesulphurisation~~ hydrodesulfurization activity (12 %wt MoO_3 and 4 %wt CoO on gamma alumina). It is concluded in this article that the HDS activity is strongly correlated with the geometrical surface-to-volume ratio of the catalyst particles but independent of catalyst shape.--

Paragraph at line 15 of page 3 has been amended as follows:

-- EP-0,428,223 discloses that the catalyst particles may be in the form of cylinders; hollow cylinders, for example cylinders having a central hollow space which has a radius of between 0.1 and 0.4 of the radius of the cylinder; straight or rifled (twisted) trilobes; or one of the other forms disclosed in US Patent No.-4,028,221. Trilobe extrudates are said to be preferred.--

Paragraph at line 1 of page 4 has been amended as follows:

-- Since many of the findings in the art are conflicting and pressure drop problems continue to be in existence, especially when surface-to-volume ratios are increased by reducing particle size, there is still considerable room to search for alternative shapes of (optionally catalytically active) particles which would diminish or even prevent such

problems. ~~It has now surprisingly been found that specifically shaped particles offer unexpected and sizeable advantages compared with conventional "trilobal", cylindrical or quadrulobal shaped particles, both in catalytic and non-catalytic duty.~~ When using a process employing a fixed bed of catalyst particles, a major consideration in the design of the process is the pressure drop through the catalyst bed. It is most desirable that the pressure drop should be as low as possible. However, it is well reported in the art that, for a given shape of catalyst particles, as the size of the catalyst particles in a fixed bed is reduced, there is a corresponding increase in pressure drop through the catalyst bed. Thus, there exists a conflict in the design of fixed catalysts beds when trying to achieve a satisfactory level of catalyst efficiency whilst keeping the pressure drop through the bed to a minimum. In addition to the above, the catalyst particles should be sufficiently strong to avoid undesired attrition and/or breakage. Especially in fixed beds the bulk crush strength should be (very) high, as beds are used in commercial reactors of up to 15 meters high. Especially at the lower end of the bed the pressure is very high and the strengths of the catalyst particles plays an important part. This is an additional complication in designing further improved catalyst particles. A still further complicating element is the manufacturing process of catalyst particles. There is a need for a fast, relatively inexpensive and suitable manufacturing process which will enable the production of catalyst particles in large quantities. One example of such a commercially available manufacturing process is an extrusion process. It is taught in the prior art that the efficiency of a catalyst in general increases as the size of the catalyst particle decreases. Further, catalysts should show a high stability, i.e. deactivation should be very low. --

Paragraph at line 13 of page 4 has been amended as follows:

-- The invention is directed to an elongated ~~Elongated~~ shaped particle comprising two protrusions each extending from and attached to a central position, wherein the central position is aligned along the longitudinal axis of the particle, the cross-section of the particle occupying the space encompassed by the outer edges of six circles around a central circle, wherein each of the six circles ~~touching~~ touches two ~~neighbouring~~ neighboring circles ~~whilst~~ and two alternating circles are equidistant to the central circle and may be attached to the central circle, and the two circles adjacent to the two alternating circles (but not the common circle) touching the central circle, minus the space occupied by the four remaining outer circles and including four remaining interstitial regions.

On page 4 above line 26, insert:

--Brief Description of the Drawings

-Fig 1 shows a cross-sectional view of an embodiment of the invention.

-Fig 2 shows a cross-sectional view of another embodiment of the invention.

On page 4 after line 26, insert:

-- It has now surprisingly been found that specifically shaped particles offer unexpected and sizeable advantages compared with conventional "trilobal", cylindrical or quadrulobal shaped particles, both in catalytic and non-catalytic duty.--

Paragraph at line 31 of page 5 has been amended as follows:

-- In Figure 1 a cross-sectional view of the preferred particles according to the invention has been depicted. The surface of the cross-sectional shape is ~~(~~indicated by the solid line~~)~~ ~~can be described as defined in the main claim~~. It will be clear from this figure (depicting the cross-section of the preferred particles) that in the concept of six circles of equal size aligned around a central circle of the same size each outer circle borders its two ~~neighbour~~ neighbor circles and the central circle, ~~whilst~~ and two alternating circles are equidistant to the central circle and may be attached to the central circle. The two circles adjacent to the two alternating circles (but not the common circle) touch the central circle.--

Paragraph at line 24 of page 6 has been amended as follows:

-- The term "equidistant" as used herein refers to the circumstance that the distance between the ~~centre~~ center of the central circle to the ~~centre~~ center of one of the outer circles is equal to the distance between the ~~centre~~ center of the central circle to the ~~centre~~ center of either one of the other remaining outer circles. --

Paragraph at line 4 of page 7 has been amended as follows:

-- The two protrusions and the central position together form the cross-section of the shaped particle. The main part of each protrusion is formed by one of the alternating circles. The main part of the central position is formed by the central circle. The interstitial areas are divided between the central position and the protrusion by a line perpendicular to the line connecting the center point of the central circle and the center part of the alternating

circle. The perpendicular line crosses the connecting line at a point exactly in the middle between the two center points (see ~~figure~~ Figure 1). The present invention does not relate to elongated shaped particles or catalyst or catalyst precursors in which any of the central circles has three or more protrusions. Thus, trilobe, quadrulobe etc. are excluded.--

Paragraph at line 20 of page 7 has been amended as follows:

-- The shaped particles of the present inventions include particles comprising one to four additional protrusions, preferably one to two additional protrusions, each attached to an existing endstanding protrusion as defined in claim 1, the additional protrusion being defined in the same way as in claim 1, the existing endstanding protrusion becoming the new central circle, the original central circle becoming the other protrusion. A cross section of the particles including additional protrusions is depicted in ~~figure~~ Figure 1b. These additional protrusions are not attached to any central position, i.e. multilobal structures as trilobes are not included.--

Paragraph at line 9 of page 8 has been amended as follows:

-- The shaped particles according to the invention can comprise particles having only one additional protrusion, or particles having at least two additional protrusions, or mixtures of both types of particles ~~particles~~.

Paragraph at line 4 of page 10 has been amended as follows:

-- The diameter is defined as the diameter of one of the circles depicted in ~~figure~~ Figure 1. --

Paragraph at line 6 of page 10 has been amended as follows:

-- The length of the particles comprising one to four additional protrusions is defined as the distance between the tangent line that touches a first protrusions and a line parallel to this tangent line that touches a second protrusion, the second protrusion being the protrusion farthest away from the first protrusion, see Figure 2.--

On page 11, delete line 22-26 and line 30-32.

Paragraph at line 27 of page 11 has been amended as follows:

-- The Fischer-Tropsch synthesis may be carried out using a variety of reaction regimes, for example a ~~fluidised~~ fluidized bed regime or a slurry bed regime. --

On page 12, delete line 1-28.

Paragraph at line 20 of page 13 has been amended as follows:

-- The catalysts of the present invention, especially for use in the Fischer-Tropsch process comprise, as the catalytically active component, a metal from Group VIII of the Periodic Table of the Elements. Particular catalytically active metals include ruthenium, iron, cobalt and nickel, more preferably cobalt. Combinations of two or more components are also possible. Preferably, a Fischer-Tropsch catalyst is used~~,~~ which yields substantial quantities of paraffins, more preferably substantially unbranched paraffins.--

On page 16, above line 18, insert:

-- The shaped particles of the invention are very useful as carriers for catalyst or catalyst precursors, which are used in mass-transfer or diffusion limited reactions, such as the Fischer-Tropsch hydrocarbon synthesis process. --

Paragraph at line 29 of page 16 has been amended as follows:

-- Depending on the catalyst and the conversion conditions, the amount of heavy wax (C_{20}+) may be up to 60 wt%, sometimes up to 70 wt%, and sometimes even up ~~till~~ to 85 wt%. --

Paragraph at line 1 of page 17 has been amended as follows:

--Preferably, a cobalt catalyst is used, a low H_2/CO ratio is used (especially 1.7, or even lower) and a low temperature is used (190-230 °C). --

Paragraph at line 4 of page 17 has been amended as follows:

-- To avoid any coke formation, it is preferred to use ~~an~~ a H_2/CO ratio of at least 0.3. It is especially preferred to carry out the Fischer-Tropsch reaction under such conditions that the SF-alpha value, for the obtained products having at least 20 carbon atoms, is at least 0.925, preferably at least 0.935, more preferably at least 0.945, even more

preferably at least 0.955. Preferably the Fischer-Tropsch hydrocarbons stream comprises at least 35 wt% $C_{30}+$, preferably 40 wt% $\underline{C_{30}\pm}$, more preferably 50 wt% $\underline{C_{30}\pm}$.--

Paragraph starting at line 30 of page 17, and ending at line 10 of page 18, has been amended as follows:

--The term helical lobed particles as used herein refers to an elongated shaped particle comprising two protrusions each extending from and attached to a central position, the central position being aligned along a longitudinal axis, the particle having a cross-section occupying the space encompassed by the outer edges of six circles around a central circle, each of the six circles bordering two ~~neighbouring~~ neighboring circles ~~whilst~~ while three alternating circles are equidistant to the central circle and may be attached to the central circle, minus the space occupied by the four remaining outer circles and including the four interstitial regions, which protrusions ~~exend~~ extend along and are helically wound about the longitudinal axis of the particle. --

Paragraph at line 8 of page 20 has been amended as follows:

-- Catalysts A, B and C were tested in a process for the preparation of hydrocarbons. Micro-flow reactors containing 10 ml of catalyst extrudates A, B and C, respectively, in the form of a fixed bed of catalyst particles, were heated to a temperature of 280 °C, and ~~pressurised~~ pressurized with a continuous flow of nitrogen gas to a pressure of 2 bar abs. The catalysts were reduced in-situ for 24 hours with a mixture of nitrogen and hydrogen gas. During reduction the relative amount of hydrogen in the mixture was gradually increased from 0% to 100%. The water concentration in the off-gas was kept below 3000 ppmv.--

Paragraph at line 20 of page 20 has been amended as follows:

-- Following reduction, the pressure was increased to 32 bara (STY 130) or 57 bara (STY 150). The reaction was carried out with a mixture of hydrogen and carbon monoxide. The space time yield (STY), expressed as gram~~mes~~ hydrocarbon product per ~~litre~~ liter catalyst particles (including the voids between the particles) per hour, the C_5+ selectivity, expressed as a weight percentage of the total hydrocarbon product, and the C_1 selectivity, expressed as a weight percentage of the total hydrocarbon product were

determined for each experiment after 50 hours of operation. The results are set out in Table I.--

Paragraph at line 1 of page 22 has been amended as follows:

-- The pressure drop in a catalyst bed packed with catalyst particles of catalyst B, with an average length of the particles of 4.5 mm, was compared to the pressure drop in a catalyst bed packed with catalyst particles of catalyst A, with an average length of the particles of 4.5 mm. The pressure drop in the catalyst bed packed with catalyst B particles was a considerably lower: the pressure drop in a column packed with catalyst B was 79.9% of the pressure drop in a column packed with catalyst A. From this result it is clear that the shaped catalyst particles according to the invention offer advantages with respect to pressure drop compared to known shaped catalyst particles.--

On page 23, above line 1, insert --We claim:--